Trend Study 25A-9-04

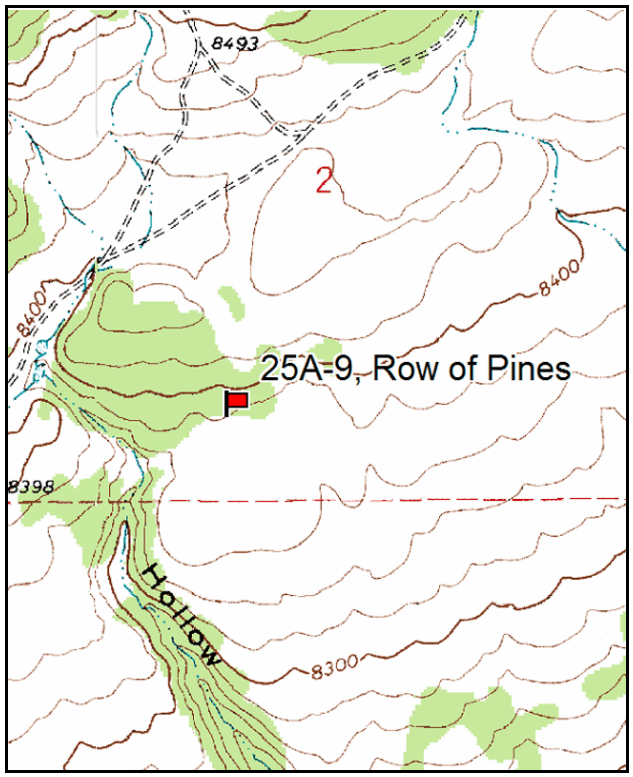
Study site name: Row of Pines . Vegetation type: Wyoming Big Sagebrush .

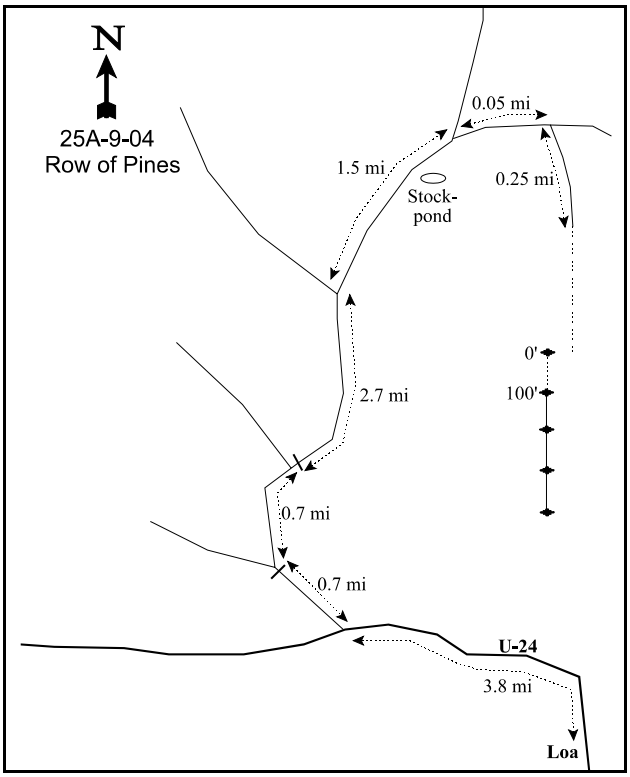
Compass bearing: frequency baseline 165 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Belt 4 rebar @ 3'.

LOCATION DESCRIPTION

From Loa, proceed northwest on U-24 for 3.8 miles (0.9 miles beyond mile marker 49). Turn right and go 0.7 miles to a cattleguard. Just beyond the cattleguard turn right and go another 0.7 miles. Turn right and go across a cattleguard. Proceed 2.7 miles to an intersection, turn right and continue 1.3 miles to a stock pond on the east side of the road. Continue 0.2 miles to a fork, turn right and go 0.05 miles. Turn right and go 0.25 miles to the end of the road, where a pellet group transect begins. On the left side of the road is a gray fence post which marks the north end of the pellet transect. Count 16 stakes south through the belt of pinyon-juniper (the 16th stake is 25 feet from the trees). The beginning of the frequency baseline is 50 feet west of the 16th pellet group stake. Rebar (2-1/2 feet tall) is used to mark the transect, the 0-foot baseline stake has a red browse tag #7064 attached.





Map Name: Loa, Utah

Diagrammatic Sketch

Township 27S , Range 2E , Section 2

GPS: NAD 27, UTM 12S 4259722 N, 442185 E

DISCUSSION

Row of Pines - Trend Study No. 25A-9

The Row of Pines trend study is located on the gently sloping Row of Pines Bench, north of Loa. The bench has a general south aspect, but the site is nearly level. Elevation is 8,400 feet. The study samples a sagebrush-perennial grass type starting near a stand of pinyon and juniper trees. Besides the trees near the 0 foot stake, there are few trees and/or escape cover on the sagebrush flat. This area is within the Seven Mile allotment which allows cattle grazing on a deferred rotation system for approximately 20 days in May. Pellet group data from 1999 estimated light use with 13 deer (32 ddu/ha), 1 elk (3 edu/ha), and 3 cow days use/acre (7 cdu/ha). Rabbit sign was moderately abundant. Pellet group data from 2004 estimated 49 deer (121 ddu/ha) and 2 cow days use/acre (5 cdu/ha). Deer and rabbit pellets were more common near the 0 foot stake which is closer to the escape and thermal cover of the pinyon and juniper trees.

Soil at the site is moderately shallow with abundant gravel sized rocks on the surface and throughout the soil profile. Texture is a sandy clay loam with a neutral pH (6.9). Soil organic matter is low at only 1.1% and phosphorus is marginal at 9.1 ppm. Values below 10 ppm may limit normal plant growth and development. The majority of protective ground cover comes shrubs, litter, and pavement. Litter has steadily declined since 1985, but increased in 2004. Rock and pavement cover have steadily increased, but decreased slightly in 2004. However, percent cover of bare ground was relatively low at 18% in 1985 and 1999. The protective ground cover and gentle slope appear to preclude serious erosion problems. The erosion condition class determined soil movement as stable in 2004.

The dominant browse is Wyoming big sagebrush. Density was 8,399 plants/acre in 1985, 8,265 in 1991, 7,100 in 1999, and 5,760 in 2004. Percent cover was estimated at 17% in 2004. These shrubs displayed moderate to heavy hedging in 1985 with lighter use reported in 1991, 1999, and 2004. Decadent plants are common with decadence ranging between 41% and 52% since 1985. The percentage of the population classified as dying was estimated at 4% in 1985, 3% in 1991, 18% in 1999, and increased to 27% in 2004. Seedlings were common in 1985 and 2004, yet lacking in 1991 and 1999. Young plants have been moderately abundant on each reading, but not in high enough numbers to replace decadent/dying individuals. Black sagebrush is the next dominate browse and was estimated at 2,665 plants/acre in 1985, 2,532 in 1991, 1,600 in 1999, and 1,300 in 2004. Utilization was moderate in 1985 and 1999, but mostly light in 1991 and 2004. Vigor was good in 1985 and 1999, but was considered fair in 1991 and 2004. Recruitment is poor with a few seedlings and young plants sampled in 1999 and 2004. Broom snakeweed is the most numerous browse species, especially on the upper (south) end of the study site. It had a high density of 10,732 plants/acre in 1985, which dropped dramatically to only 1,465 plants/acre in 1991. This was a common occurrence throughout the management area. The much larger sample used in 1999 estimated 11,300 plants/acre, a similar density to 1985. In 2004, the density dropped again to 640 plants/acre and is a mostly mature population. Other increasers present in low numbers are narrowleaf low rabbitbrush and prickly pear cactus.

The herbaceous understory is dominated by blue grama, a low-growing warm season perennial that provides very little forage. It provided 13% of the total vegetation cover in 1999 and 9% in 2004. The only other grass found more than occasionally is bottlebrush squirreltail. Forbs are small and sparse. They provided only 1% of the total cover in 1999 and 2004.

1985 APPARENT TREND ASSESSMENT

Soil trend appears stable and there is no serious erosion evident. The vegetative trend is presently down, as populations of big and black sagebrush appear to be declining.

1991 TREND ASSESSMENT

Soil trend is slightly down because of lower vegetative cover and increase in bare ground and decrease in litter cover. These are all downward indicators reflective of an drought. The two key browse species are also showing a slightly downward trend with population losses of 5% and 2% respectively for black sagebrush and Wyoming big sagebrush. The occurrence of Wyoming big sagebrush on this site instead of mountain big sagebrush, further illustrates the relative dryness of the site. This is additionally compounded by the relatively high density the sagebrush populations have to contend with on this site. The herbaceous understory trend is stable but in poor condition because the dominant grass is a very low growing warm season grass (blue grama) which is of little value for spring or fall use.

TREND ASSESSMENT
soil - down slightly (2)
browse - down slightly (2)
herbaceous understory - stable (3)

1999 TREND ASSESSMENT

Trend for soil is slightly up. Relative percent cover of bare ground has declined from 28% to 14%. Litter cover has declined slightly however. Relative percent cover of rock and pavement has decreased slightly. Vegetation cover numbers increased dramatically, but vegetation cover data from 1985 and 1991 measured only basal cover, while aerial cover is estimated now so the numbers are not comparable. There appears to be little erosion due to the levelness of the terrain. Trend for the key species, Wyoming big sagebrush is down slightly. Density has declined since 1991, but some of the change is due to the much larger sample used in 1999. Use is heavier, and percent decadence remains high. In addition, a large portion of the decadent plants sampled (44%) appear to be dying. Recruitment is currently inadequate to replace the proportion of dying plants. The less abundant black sagebrush appears to be more stable, but only contributes to 13% of the browse cover. Trend for the herbaceous understory is up for grasses and stable for forbs. Overall trend is considered up since grasses provide nearly all of the herbaceous cover. Composition is poor however, with the low growing warm season, blue grama, providing 84% of the grass cover. The Desirable Components Index rated this site as good with a score of 51 due to good shrub cover, fair perennial grass cover, but high shrub decadence.

TREND ASSESSMENT
soil - slightly up (4)
browse - down slightly (2)
herbaceous understory - up (5)
winter range condition (DC Index) - 51 (good) Wyoming big sagebrush type

2004 TREND ASSESSMENT

Trend for soil is stable even with the slight increase in relative percent soil which was not enough warrant a downward trend for soil. Pavement and rock decreased slightly as did vegetation cover, but percent litter increased. Trend for key browse Wyoming big sagebrush and Black sagebrush is down. Wyoming big sagebrush densities decreased and percent decadence increased. Seedling production was high, but very few young plants were observed. The number of plants classified as dying increased from 18% in 1999 to 27% in 2004. Black sagebrush had similar observations as the Wyoming big sagebrush. Densities were lower with an increase in percent decadent and dying plants. Young recruitment was low as well. Trend for the herbaceous understory is down because the perennial grasses contribute to 92% of the perennial herbaceous production and the nested frequency and quadrat frequency dropped by an average of 39%. The dominate species, blue gramma, has decreased greatly since 1999 indicating severe summer drought. The Desirable Components

Index rated this site as fair with a score of 37 due to good shrub cover, high shrub decadence, and decreased perennial grass cover.

TREND ASSESSMENT
soil - stable (3)
browse - down (1)
herbaceous understory - down (1)
winter range condition (DC Index) - 37 (fair) Wyoming big sagebrush type

HERBACEOUS TRENDS --
Management unit 25A, Study no: 9

Type	Species	Nested Frequency				Average Cover %	
		'85	'91	'99	'04	'99	'04
G	Agropyron smithii	-	-	12	3	.07	.00
G	Agropyron spicatum	-	-	6	-	.01	-
G	Bouteloua gracilis	100	102	173	105	5.55	2.06
G	Oryzopsis hymenoides	$_{b}$31	$_{a}$7	$_{a}$10	$_{a}$3	.10	.04
G	Poa secunda	-	-	2	-	.00	-
G	Sitanion hystrix	$_{a}$58	$_{ab}$82	$_{b}$110	$_{ab}$61	.84	.74
G	Stipa pinetorum	-	4	4	11	.03	.05
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		189	195	317	183	6.63	2.90
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F	Androsace septentrionalis (a)	-	-	$_{b}$87	$_{a}$11	.44	.02
F	Arabis demissa	$_{b}$22	$_{ab}$12	$_{a}$6	$_{b}$24	.04	.05
F	Astragalus lentiginosus	$_{b}$21	$_{a}$3	$_{a}$3	$_{a}$7	.01	.01
F	Chenopodium leptophyllum(a)	-	-	-	4	-	.01
F	Cryptantha spp.	2	7	-	-	-	-
F	Descurainia pinnata (a)	-	-	4	1	.01	.00
F	Eriogonum ovalifolium	7	16	13	10	.19	.08
F	Erigeron pumilus	$_{ab}$20	$_{a}$-	$_{b}$34	$_{a}$6	.23	.04
F	Phlox longifolia	$_{a}$8	$_{b}$33	$_{a}$-	$_{a}$6	.00	.01
F	Senecio multilobatus	$_{a}$-	$_{a}$1	$_{b}$23	$_{ab}$6	.06	.04
Total for Annual Forbs		0	0	91	16	0.45	0.04
Total for Perennial Forbs		80	72	79	59	0.54	0.25
Total for Forbs		80	72	170	75	0.99	0.30

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 25A, Study no: 9

Type	Species	Strip Frequency		Average Cover %	
		'99	'04	'99	'04
B	Artemisia frigida	6	4	.03	.00
B	Artemisia nova	20	23	4.51	2.30
B	Artemisia tridentata wyomingensis	93	93	24.40	17.31
B	Chrysothamnus viscidiflorus stenophyllus	0	2	-	.03
B	Gutierrezia sarothrae	64	22	4.71	.18
B	Opuntia fragilis	11	10	.06	.18
B	Pediocactus simpsonii	1	5	-	.00
B	Pinus edulis	0	0	-	.00
Total for Browse		195	159	33.74	20.03

CANOPY COVER, LINE INTERCEPT --
Management unit 25A, Study no: 9

Species	Percent Cover
	'04
Artemisia nova	2.33
Artemisia tridentata wyomingensis	21.43
Gutierrezia sarothrae	.51
Opuntia fragilis	.06

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 25A, Study no: 9

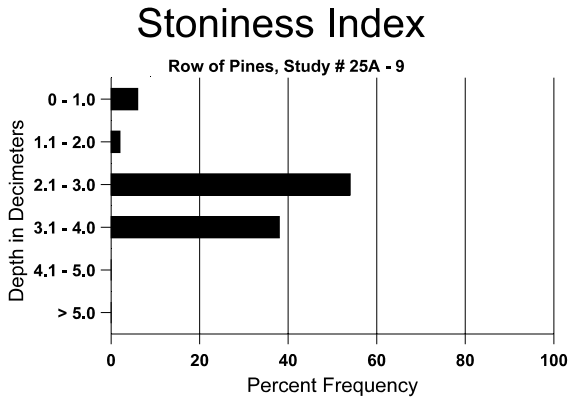
Species	Average leader growth (in)
	'04
Artemisia tridentata wyomingensis	2.2

BASIC COVER --
Management unit 25A, Study no: 9

Cover Type	Average Cover %			
	'85	'91	'99	'04
Vegetation	10.00	6.00	41.90	23.89
Rock	2.75	3.75	8.67	6.71
Pavement	31.75	34.75	33.29	27.15
Litter	34.50	24.50	22.44	32.81
Cryptogams	3.50	3.50	2.30	1.96
Bare Ground	17.50	27.50	18.19	23.42

SOIL ANALYSIS DATA --
Management unit 25A, Study no: 9, Study Name: Row of Pines

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
12.7	59.3 (13.8)	6.9	51.3	23.4	25.3	1.1	9.1	192.0	0.5



PELLET GROUP DATA --
Management unit 25A, Study no: 9

Type	Quadrat Frequency	
	'99	'04
Rabbit	28	49
Elk	-	-
Deer	15	30
Cattle	3	2

Days use per acre (ha)	
'99	'04
-	-
1 (2)	-
13 (32)	49 (121)
3 (7)	2 (5)

BROWSE CHARACTERISTICS --
Management unit 25A, Study no: 9

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Artemisia frigida												
85	**0**	-	-	-	-	-	0	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	0	-	0	-/-
99	**240**	-	20	200	20	-	17	42	8	-	0	3/4
04	**100**	-	20	80	-	-	0	0	0	-	0	5/6
Artemisia nova												
85	**2665**	266	466	1066	1133	-	53	0	43	-	0	10/13
91	**2532**	-	266	933	1333	-	5	0	53	9	32	8/14
99	**1600**	-	80	1220	300	-	69	5	19	8	8	10/17
04	**1300**	100	-	920	380	440	6	0	29	18	18	7/17
Artemisia tridentata wyomingensis												
85	**8399**	466	466	4000	3933	-	60	28	47	4	13	16/17
91	**8265**	-	866	3133	4266	-	19	5	52	3	10	16/19
99	**7100**	120	380	3820	2900	800	43	12	41	18	18	18/28
04	**5760**	1380	100	2760	2900	2020	30	6	50	27	27	16/26
Chrysothamnus viscidiflorus stenophyllus												
85	**466**	-	-	200	266	-	0	0	57	-	0	7/9
91	**0**	-	-	-	-	-	0	0	0	-	0	-/-
99	**0**	-	-	-	-	-	0	0	0	-	0	-/-
04	**60**	-	-	60	-	-	0	0	0	-	0	5/6
Eriogonum microthecum												
85	**0**	-	-	-	-	-	0	0	-	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**0**	-	-	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	3/5
Gutierrezia sarothrae												
85	**10732**	1333	3466	6933	333	-	1	0	3	-	0	8/7
91	**1465**	-	666	266	533	-	23	9	36	1	5	2/2
99	**11300**	860	880	10200	220	220	0	0	2	.88	.88	8/9
04	**640**	-	40	600	-	-	0	0	0	-	0	6/7
Opuntia fragilis												
85	**0**	-	-	-	-	-	0	0	-	-	0	-/-
91	**66**	-	66	-	-	-	0	0	-	-	0	-/-
99	**260**	20	40	220	-	40	0	0	-	-	0	3/9
04	**220**	-	-	220	-	20	0	0	-	-	9	2/10

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Pediocactus simpsonii												
85	**0**	-	-	-	-	-	0	0	-	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**20**	-	-	20	-	-	0	0	-	-	0	1/2
04	**160**	-	-	160	-	-	0	0	-	-	0	1/2
Pinus edulis												
85	**0**	-	-	-	-	-	0	0	-	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	-	0	-/-
99	**0**	40	-	-	-	-	0	0	-	-	0	-/-
04	**0**	-	-	-	-	-	0	0	-	-	0	-/-